

THE ZOOLOGIST.

THIRD SERIES.

VOL. VI.]

MAY, 1882.

[No. 65.]

ON THE HYBERNATION OF THE DORMOUSE.*

By A. RABUS.

IN July, 1879, I received from London two dormice (*Muscardinus avellanarius*), the one a male of about a year old, the other a female of a few weeks. I at once commenced to observe them closely and carefully, and learnt with certainty many facts hitherto little known, and possessing much interest, especially with regard to the increase and decrease in the weight of these animals during their winter sleep. The two mice were sent over to Germany in one cage, and in consequence of this the male had badly bitten the tail of the female, so that about three weeks passed before it quite healed. In the meantime both mice grew well and quickly.

I keep them separately in a little wooden cage with wires, in which they make their nests of wool and tow, and continue to give them materials for this purpose, until they leave off dragging any more into their hole. Thus they have the nests made entirely to their liking. At the commencement of their winter sleep I strew a little insect-powder at the bottom of each nest to guard against insects or mites. The little cages, their separate sleeping places, stand together in one large bird-cage, into which the mice can go out at will to fetch their food and take exercise. At night they generally climb into the top of the cage, or sit and eat on their wooden boxes; but always draw back timidly if

* 'Beiträge zur Kenntnis über den Winterschlaf der Siebenschläfer'; von A. Rabus, "Der Zoologische Garten," 1881, pp. 321-325.

I speak to them. I feed them on hazel nuts and filberts, as well as soft-seeded fruits; and three hazel nuts or one filbert generally constitute their daily quantum of food. In addition to this they get a bit of apple or pear, or perhaps a cherry, according to the time of year. I found they did not care for apricots, strawberries, or grapes; a really good sweet pear seemed to be their favourite delicacy. Of smaller fruits they never ate any quantity.

In 1880 I attempted to make them open their nuts for themselves, thinking this would be more natural to them; until then I had always given them the nuts ready cracked, but this experiment was entirely unsuccessful. During the first night they gnawed round holes the size of peas in the nut-shells, and took out all the contents. The next time they gnawed at the nuts without touching the kernel; and in the nights following they made scarcely any attempt at even gnawing them, so that in a short time they became very weakly and thin, and would probably have died of starvation had I not given up my experiment, when they recovered in a few days. Although of different ages, they seemed never to have obtained their food in this state, and thus I was unable to accustom them to it. The experiment might perhaps have succeeded with the female, which was only a few weeks old, had I made the attempt immediately on receiving it; but I did not do so till a year later, and then without success. Both mice went to sleep on September 23rd, 1879, when the temperature was 0° Réaumur. The bodily heat of the female was less than that of the male. Amongst other hibernating animals the temperature during their hibernation is known to vary considerably, a fact which is very striking in the case of the Ground Squirrel, *Spermophilus citillus*, and which has been made an object of careful study and observation by Horwarth.*

The position of the mice during sleep is generally as follows: they curl themselves up, pressing the fore paws firmly against the cheeks, the tail turned forward towards the head, and lie in the nest with the back of the head uppermost. Occasionally I find them lying on their backs, the nose pointing upwards. With regard to their weight before and during hibernation, I made the

* 'Beiträge zur Lehre über den Winterschlaf. Abhandlungen der phys. med. Gesellschaft,' Würzburg, vii., xiii., und xiv. Bd.

following observations: at a temperature of $+3^{\circ}$ Réaumur a slight whistling sound might be heard from both of them.

MALE.

Weighed on Sept. 2, 1879, 39 gr.
 " Sept. 23, " 43 gr.
 Fell asleep on Sept. 23, 1879.
 Weighed on Oct. 19, 1879, 39 gr.
 " Nov. 4, " 38 gr.
 " Nov. 29, " 35 gr.
 " Dec. 28, " 33 gr.
 " Jan. 31, 1880, 34 gr.
 A few days later he lay dead in the nest.

FEMALE.

Weighed on Sept. 2, 1879, 25 gr.
 " Sept. 23, " 35 gr.
 Fell asleep on Sept. 23, 1879.
 Weighed on Oct. 19, 1879, 33 gr.
 " Nov. 4, " 32 gr.
 " Nov. 29, " 31 gr. :
 temperature -7° R.
 Weighed on Dec. 28 " 29 gr. ;
 temperature -16° R.
 Weighed on Jan. 31, 1880, 27 gr. ;
 temperature -10° R.
 On February 7th I counted twenty respirations to the minute.

FEMALE.

Weighed on Feb. 29, 1880, 26 gr.
 " Mar. 27, " 24 gr.
 Awoke on April 15th, evacuated, ate, and came outside its nest in the morning, having thus slept uninterruptedly for 6 months 23 days.
 Weighed on May 1, 1880, $24\frac{1}{2}$ gr.
 " May 29, " 27 gr.
 " July 3, " $24\frac{1}{2}$ gr.
 " July 31, " 26 gr.
 " Sept. 5, " 24 gr.
 Fell asleep Sept. 21, "
 Weighed on Oct. 2, " 37 gr.
 " Oct. 31, " 35 gr.
 " Nov. 27, " 33 gr.
 " Dec. 23, " 32 gr.
 Was lively on Dec. 31st, but did not eat anything.

Weighed on Jan. 29, 1881, 30 gr.
 " Feb. 26, " 29 gr.
 " Mar. 27, " 26 gr.
 Awoke on April 9th, evacuated, and ate, having slept for 6 months 19 days, with one single interruption on Dec. 31st.
 Weighed on April 30, 1881, 25 gr.
 " July 2, " 23 gr.
 " July 30, " 27 gr.
 " Aug. 27, " 29 gr.
 Fell asleep Sept. 24, "
 Weighed on Oct. 1, " 37 gr.
 " Oct. 29, " 34 gr.
 " Nov. 26, " 33 gr.

A male Dormouse which I received from London on Sept. 2nd, 1881, weighed as follows:—On September 3rd, 21 gr. ; on October 1st, 28 gr. ; on October 29th, 31 gr. : on November 26th, 30 gr. ; fell asleep on the 15th of October, but his sleep was not so unbroken as that of the female, for he awoke several times a month, took food (though in smaller quantities than usual), and evacuated.

The variations in the weight of the female during the summer months from May to September may have arisen from some slight organic disturbance. I found no increase in weight during hybernation, except in the case of the last-mentioned male from

the 1st of October to the 26th November, which, as described above, began its sleep on October 15th, and on November 26th showed an increase in weight of 3 gr. According to Horwarth other species of hibernating animals, such as the Ground Squirrels, increase in weight during hibernation. I observed that the greatest increase in weight took place in the month of September, as from 39 to 43, from 25 to 35, from 24 to 37, from 29 to 37, and from 21 to 28 gr. During the very regular hibernation of the female there was a total decrease in weight of 11 gr., not quite 2 gr. a month.

On examining, under a microscope, the excrement voided during the first days after awaking, which had lain almost seven months in the intestines, I was unable to distinguish any fatty particles from the nuts, whilst particles of fruit were present in abundance; possibly a proof that the fatty portion of the food had been entirely absorbed in the formation of fat in the body. In addition a kind of leathery substance was present in abundance, which I cannot as yet fully determine, but which in form has some resemblance to the well-known psorosperms in the muscles of the pig.

I will mention one more incident in my experience, as it presents an apparent contradiction to the characteristics of these little creatures.

In Brehm's 'Thierleben' it is expressly stated that "they never venture to defend themselves against their captors, never attempt to bite," &c. But on September 20th, 1881, when I was cleaning out the cage as usual, I suddenly observed the male to be outside the cage, on the window, and at once snatched at him. The mouse, making a violent piping sound, bit me on the finger so deeply that it was impossible to shake him off, and I had to place my hand in the cage, when he at last let go his hold. Since that time my confidence in the gentleness of the Dormouse has been somewhat shaken, although I am firmly persuaded that they never attempt to bite when stroked gently and carefully.

At present the two mice are separated, but at the end of their winter sleep I shall again place them together, in the hope of their breeding, although this seldom occurs in captivity. Should they breed I hope to make further observations concerning them.

ORNITHOLOGICAL NOTES FROM NATAL.

BY MAJORS E. A. BUTLER AND H. W. FEILDEN, AND CAPT. S. G. REID.

MUCH has already been written on the Ornithology of Natal, but the old saying "every little helps" is especially applicable to the study of birds; and it would have been contrary to human and ornithological nature if we, who found ourselves condemned to a life of comparative idleness for months at Newcastle, owing to the unexpectedly peaceful results of the operations against the Boers, had not devoted our spare time to our favourite science.

The aggregate results of our labours we now present in the form of a catalogue, and we trust that they will serve to throw some further light on the geographical distribution of certain species, and in this respect form a supplement to Mr. T. Ayres' valuable contributions to the Ornithology of Natal, which appeared in 'The Ibis' in 1860 and following years.

Newcastle was our head-quarters from March to November, 1881, and most of our work was carried on from that miserable town, a most unfavourable position for collecting; but we made several journeys and expeditions to other parts of the colony, which afforded us many additional species. We were much struck by the uncertain and apparently erratic breeding of some of the Natal birds. Nests were found in winter as well as in spring and summer, and it was impossible to say at what time some of the species were going to breed. In Capt. G. E. Shelley's paper, "Three Months on the Coast of South Africa," in 'The Ibis' for January, 1875, he mentions having found several birds nesting at Durban in March and April, equivalent to September and October in northern latitudes. Would not these breed a second time in the summer months, November and December, and do the majority of species in Natal follow this law, or were these instances merely accidental?

Our notes on *Strix capensis*, *Cypselus melba*, *C. apus*, *Columba phæonota*, and *Scopus umbretta* refer to similar cases, and though we are unable to prove the existence of any systematic double-breeding, the facts remain and afford a most interesting question for future solution.

The nesting of *Falco biarmicus*, *Ardea goliath*, *Platalea tenuirostris*, *Geronticus hagedash*, &c., will doubtless prove of

considerable interest to all who are acquainted with the South-African avi-fauna.

Capt. G. E. Shelley has kindly named and classified our respective collections, and has described the two new species, *Anthus butleri* and *Sphenæacus natalensis*, in the 'Proceedings' of the Zoological Society for March, 1882. We have adopted throughout the nomenclature used by him, and by Mr. R. Bowdler Sharpe, in his new edition of Layard's 'Birds of South Africa.'

Unless otherwise stated all dates refer to the year 1881. The initial letters B, F, and R, after various paragraphs, denote that the observations were made by individuals, not by the three of us collectively.

Gyps kolbi (Daud.), South African Griffon Vulture.—This most useful bird is exceedingly numerous in the Newcastle district, as many as seventy or eighty being frequently seen together. Its numbers appear to diminish towards the coast-line, though it can nowhere be called anything but a common species. A dozen or more were feeding on a carcass at Maritzburg on December 12th, 1881. Its stronghold would appear to be in the more elevated kloofs of the Drakensberg, where it undoubtedly breeds in considerable numbers in the month of May. Butler observed hundreds of them, apparently nesting, in some steep "krantzes" not far from Newcastle in May, 1881, but, thinking it too early, did not try for eggs. It may possibly have been a roosting-place only. In this land of dead animals the presence of such a watchful army of scavengers is of incalculable advantage. What would happen if the "Aas-vogels" were to strike work is hard to imagine! As it is there are always too many carcasses of horses and oxen to be seen lying about untouched, poisoning the atmosphere and the water supply in their decomposition. Fortunately the "Aas-vogel" is not (to our knowledge, at any rate) sought after for the table, and his repulsive appearance at close quarters is, moreover, much in his favour. Anything more horribly grotesque than one of these Vultures waddling along in a vain attempt to take flight after a good "gorge" cannot be imagined; but compare the same bird as seen a quarter of an hour before, circling in magnificent spirals far above his intended meal, and you have indeed a descent from the sublime to the ridiculous.

In discussing a carcass a good deal of noise proceeds from the greedy crew—a harsh, grating cry of anger apparently. They fight

occasionally, and the young birds have to sit round till their parents and ancestors are full. We observed a hungry, but patient circle of dark immature birds waiting their turn at a dead ox on the Ingagane River. On one occasion at Newcastle, at a time, too, when telegraphic communication was a matter of life and death, a large gathering of "Aas-vogels" frightened suddenly from a carcase directly underneath the telegraphic wires, got "mixed up" in their confusion, and caused the wires to become seriously entangled. This stopped the transmission of messages completely, but fortunately the mishap occurred close to headquarters, and things were quickly righted. From some unknown cause, very few of these birds were seen round Newcastle in September, 1881. From the 1st to the 26th of that month they were almost entirely absent. Could they have been driven away by the severe snow-storm and cold weather at the end of August?

Otogyps auricularis (Daud.), Eared Vulture. — Occasionally seen in the north-west portion of Natal; shy and retiring.

Lophogyps occipitalis (Burch.), White-headed Vulture. — A pair seen at the Ingagane River, July 23rd, 1881 (R).

Neophron percnopterus (Linn.), Egyptian Vulture. — A pair of adult birds seen in April on a rocky bank of the Buffalo River, about four miles east of Newcastle (B). An adult bird seen at Colenso on the 20th November (R).

Serpentarius secretarius (Miller), Secretary Bird. — Common in the Newcastle district, becoming scarcer down country. There is a penalty of £10 for killing one of these extraordinary birds, on account of the good service they render in destroying snakes. Several pairs are always to be met with in the course of a ride over the "veldt" between Newcastle and Ladysmith. Near the latter place it breeds undoubtedly, and most probably does so wherever there are suitable trees throughout the district. In a nest taken at Ladysmith by an officer of "The Welsh" Regiment, one egg was white, the other distinctly blotched and coloured with red. Length of an adult specimen, shot (in ignorance of the penalty) at the Ingagane in June, 3 ft. 4 in., without the two long central tail-feathers, 4 ft. 3 in. with these; wing, 2 ft. 2½ in.; tail, 2 ft. 2 in.; tarsus, 1 ft.; expansion of wings, 6 ft. 9 in. The soft parts of this specimen were as follows:—Iris hazel; bill pale bluish grey, base of the lower mandible gradually

changing to yellowish green, which is also the colour of the cere; bare skin round eye and at gape, rich orange; legs and toes, light flesh-colour; claws, neutral tint (R).

There is a considerable resemblance between these birds and the Cranes when seen at a distance on the ground, and even on the wing a Secretary-bird looks more like a Crane than a member of the *Falconidæ*; but once in motion, whether walking or running over the "veldt," the resemblance vanishes; it is hard to conceive anything more graceful than the Crane, while the Secretary-bird walks badly, and runs in the most ungainly fashion. Butler observed this species near Estcourt.

Polyboroides typicus, Smith, Banded Gymnogone.—Two specimens obtained in the kloofs of the Drakensberg, near Newcastle, one by Butler on the 21st July, the other by Feilden about the same time. The bird shot by Butler was a male developed for breeding, and there was a female with it at the time, which he failed to procure. There seems to be a good deal of the Harrier about this genus, as far as external appearance goes, but in flight it is more like a Buzzard.

Soft parts of specimen obtained as follows:—Male: legs, feet, orbital skin, and cere, lemon-yellow; bill, whitish at base and tipped black; iris blackish brown (B).

Circus pygargus (Linn.), Montagu's Harrier.—"A beautiful male Harrier passed within a few yards of me between Ladysmith and Colenso on the 20th November. I was in uniform at the time, and had no gun with me. I believe it to have been a Montagu's Harrier, and entered it as such in my note-book, but it is possible that it may have been *Circus macrurus*, the Pallid Harrier, a much commoner species in these parts. I know Montagu's Harrier well, but have never met with the other before" (R).

Circus ranivorus (Daud.), South African Marsh Harrier.—Exceedingly common everywhere, nesting in the "vleys," and in the long dry grass surrounding them, in September and October. When a nest was robbed of its eggs the old birds frequently laid again there, sooner than construct a fresh one. Butler contributes the following note of its nidification:—"Sept. 22nd, four fresh eggs. The nest was of moderate size, and built in high rushy grass by the side of a small tank, being composed of rushes, intermingled with a few sticks and well lined with fine dry grass.

It was raised about a foot above the level of the water, which was scarcely visible through the long dense rush, though several inches deep. Another nest, on the 25th September, similar to the last, without sticks, and built in long dry grass on high ground between two sheets of water, contained three incubated eggs. The old birds hovered round me, and squealed loudly when I approached the nest. Another nest, precisely similar, in long dry grass by a 'vley,' 1st October, contained four incubated eggs; female sat very close, rising off the nest almost at my feet. The pair of which I took the nest on the 22nd September built again immediately afterwards, about ten yards from where the first nest was taken, and on the 12th October I took three fresh eggs from the nest, and on the 16th it contained another fresh egg. On the 18th October I found two more nests, one building, the other containing three incubated eggs. Eggs pale bluish white, having a green membrane within."

Accipiter rufiventris, Smith, African Sparrowhawk.—A male obtained in the Drakensberg, near Newcastle, on August 27th. Soft parts as follows:—Legs, feet, and orbital skin lemon-yellow; cere greenish yellow; iris bright yellow; bill plumbeous, tip blackish; claws black. Sexual organs considerably developed. Other specimens were observed, but it was by no means common.

Buteo jakal (Daud.), Jackal Buzzard.—A very common bird in the upper portion of the colony, but very shy and difficult to obtain. Breeds in "krantzies," without any great choice of site, in July. Butler notes that in a fine adult male specimen, shot by him, the iris was grey-brown; legs, feet, cere, and gape, lemon-yellow; bill horny blue, tip blackish. The crop contained four or five striped field mice. He also took a nest in a bush growing out of a rock on the side of a precipitous cliff, about six feet below the summit, containing two fresh eggs, on July 30th; one was plain white, the other faintly marked towards the large end with light yellowish brown. The nest was an ordinary large stick-structure, well lined with tufts of grass and green leaves. The old birds were seen to stoop at a brace of Francolin, *F. levaillantii*, in long grass close by, capturing one of them.

Milvus ægyptiacus (Gm.), Yellow-billed Kite.—Two pairs of this Kite were seen near Rorke's Drift on October 3rd, 1881 (R).

Milvus korschun (Gm.), Black Kite.—Apparently a regular visitor in the summer months to the Newcastle district. It was

seen there by Butler in March, and by Reid in October and November. The latter shot a young male on October 28th. Iris light brown; bill black, yellowish at base and gape; cere yellow; legs and toes orange. The crop contained a small frog and a number of beetles.

Elanus caeruleus (Duf.), Black-shouldered Kite.—First observed on August 1st at Addendorf's Farm, about eight miles south of Newcastle; afterwards occasionally noted in the district. Common along the road to Colenso, and also seen down to the coast. Examples recorded at Richmond Road on December 10th, and at Durban on August 12th (R).

A pair apparently attempted to nest at Cochrane's Farm, close to Newcastle, in October, but the nest was disturbed and nothing came of it. Eggs were taken by an officer of "The Welsh" Regiment near Ladysmith. The men of this Regiment had a young bird in camp, very tame and friendly (R).

Falco biarmicus, Temm., South African Lanner.—Feilden kept one of these grand birds alive for some time at Bennett's Drift Camp, near Newcastle; it was a female, and had been winged by a shot. Butler found a nest containing young birds in down in a kloof in the Drakensberg, near Newcastle, on the 18th August. The nest was a good sized stick-structure, and built in a small green bush on the side of a precipitous cliff, within six feet of the summit, but in an inaccessible situation, on account of an overhanging ledge of rock which completely covered it from above. The chicks were but a few days old and covered with white down. He poked two out of the nest from below with a long pole, but there may have been more. The female bird was shot at the nest, but the male escaped, badly wounded unfortunately. The nest looked as if it was an eyry of long standing, and was probably used by the same pair of birds for years. Butler noticed a Lanner on several occasions amongst the hills in the vicinity of Newcastle, but it is not very common.

Falco ruficollis, Swains., African Rufous-necked Falcon.—A male shot by Reid near Rorke's Drift on October 4th, one of a pair frequenting a clump of mimosas on the Buffalo River; no nest to be found. The female escaped, and, when Capt. Watkins, R.E., visited the place in November, had taken to herself another mate.

Cerchneis rupicola (Daud.), South African Kestrel.—Abundant throughout the colony, nesting in holes and crevices in the cliffs,

or "krantzies." Two eggs taken on October 11th were simply laid in a depression in the sandy floor of a miniature cavern. Butler took four slightly incubated eggs on October 16th. They were laid in a depression on the bare rock on a ledge in the crevice of a cave: situation inaccessible, except with ropes, &c. The eggs are very like those of the common European Kestrel in colouring.

Cerchneis rupicoloides (Smith), Large African Kestrel.—Not observed nearer to Newcastle than Rorke's Drift, where Reid found a pair breeding, and took one egg from a nest on October 4th. He obtained the male bird. Iris white; bill bluish horn-colour, softening into yellowish white at the base; cere and legs Indian-yellow. Near Ladysmith it seems to be a common species. Eggs were taken by officers quartered there in October, and numbers of the birds were observed perching on the telegraph-wires near the junction of the Free State and Newcastle Roads by both Feilden and Reid in November and December.

(To be continued.)

ORNITHOLOGICAL NOTES FROM YORKSHIRE.

BY WILLIAM EAGLE CLARKE.

IN 1880 the chief incident for January was an unlooked-for immigration of Fieldfares and Short-eared Owls. Fieldfares, which had been almost entirely absent during the autumn of 1879, appeared in considerable numbers at Spurn on Jan. 24th. The Owls immediately followed, and were somewhat numerous on the Holderness coast during the latter days of the month. A large party of Swans, most probably Hoopers, were observed passing Withernsea, in a southerly direction, on one of the early days of the year. During the severe weather of January and February, Brent—or as they are locally termed "Rock"—Geese were extremely abundant on the Humber estuary, coming up to the shore and retiring on every tide.

In my notes for 1879,* I alluded to the occurrence of a flock of Shore Larks at Easington on December 22nd. These birds were again seen on February 9th, and between that date and March 20th I had many opportunities of observing them. At

* 'The Zoologist,' 1880, p. 353.

first they frequented a bare flat of sand and pebbles at some distance above high-water mark on the sea-side, but very soon transferred their affections to a long and narrow bed of *débzis*, composed chiefly of the withered blades of the marine plant *Zostera maritima*, which had been heaped up by the tide into a series of little hillocks and depressions, on the Humber fore-shore. To this they were most constant, occupying themselves in searching for food over its undulating surface, or basking in the sunshine, in a crouching position, on one of its hillocks. At all times they evinced but little fear, as I watched them with the binocular from a distance of about twenty yards. On March 13th I counted twenty together, which was the largest number seen in one party. On this day the sun was very brilliant, and the old males of the assemblage were very conspicuous; the black of their breasts, crowns, and patch below the eye, the fine brimstone-yellow of their throats, the lateral horn-like tufts, and the warm vinous tints on their napes and shoulders, contrasted advantageously with the identical but more subdued colours of the immature birds and females of the group. The mature males, on a closer examination of specimens obtained, appeared to have more massive heads and to be generally of a stouter build than the others. The flight is jerky, and whilst on the wing they uttered a note which bore a somewhat close resemblance to that of the Meadow Pipit. The contents of all the stomachs examined consisted of one description of food, which at sight appeared to be the small coiled shells of a mollusk, but on examination with a lens they proved to be seeds of a marine plant, and perhaps those of *Zostera*. I saw these birds for the last time on March 20th, on which day they most probably departed, for they were not seen afterwards. I regret to say that no less than thirty-three specimens were obtained, and a carefully compiled list of these showed that the males predominated to the extent of five to one. The great majority were immature males, which, so far as I could perceive, were indistinguishable from the females.

At Easington, on March 20th, I saw a Rough-legged Buzzard flying leisurely along the coast-line, pursued by about a dozen Grey Crows. In a remote locality among our north-western fells, on March 26th, I was much gratified to observe a Common Buzzard sailing over the craggy haunts that once knew this bird so well, but from which it is now so utterly banished that I doubt

if the county can boast of possessing more than a single pair nesting annually.

On March 29th I visited a Raven's nest. This species has of late years become very scarce in the county, though we possess such an extended fell range in the north-west and suitable cliffs on our sea-board, both of which—and our larger woods, too—once harboured Ravens in some numbers; but now only two or three pairs are known to me as nesting, and I much fear that a very few years will suffice to see the Raven's name erased from the list of resident Yorkshire birds. The nest contained five eggs, and was placed in an angle of a cliff, some twenty feet from the top, and with a sheer drop of about two hundred feet below. The date was late for this species to be commencing incubation; but the pair had set their hearts upon a site on the other side of the fell, from which they were driven at the last moment by a pair of Peregrines, which appeared upon the scene and pitched upon the nest as suitable for their own purposes. The young were hatched on April 11th.

On April 14th I again visited the Ravens' locality, in response to a missive from my friend, informing me that the Peregrine was sitting, and the pair were playing "old gooseberry" with his Grouse, and must be destroyed, and I might have the eggs. I did all in my power to have the old bird spared, but it was of no avail; Grouse were almost the only birds at hand, and my friend could not afford the *quantum* requisite to feed so hungry a family. Accompanied by my friend and his keeper I set out for the nest, to which it was a stiff climb. On reaching the brow of the fell, the male commenced to utter a plaintive cry, evidently from a very considerable height, for although we could hear him most distinctly, yet we entirely failed to distinguish his form. When we had arrived immediately above the nest, the keeper gave a loud whistle, which caused the old bird to leave the nest with a deep downward dive, when she received the contents of both barrels, and was killed. She was a grand old bird, weighing thirty-three ounces, and measuring forty-four inches across the wings. The nest was placed on, or rather occupied, the top of a small column of rock, which was stuck, as it were, on to the smooth face of the cliff, whose slope had a considerable inward tendency, rendering it necessary to put one's head and shoulders uncomfortably far over the brink to obtain a glimpse of the nest,

which was composed of old heather-stems, with little or no lining, and appeared to be a somewhat ancient structure. In it were four eggs, which we obtained by means of a net attached to a long rod, brought with us for the purpose, the rocky nature of the place and the stiff slope to the brink rendering the use of a rope quite impossible. Angling for the eggs was not at all a pleasant task; the ground above sloped not only smartly to the cliff, but as smartly to the left, from which point alone it was possible to work, making it necessary to be held by ropes from behind and from the right. The dizzy depth beneath, and the distance it was necessary to place one's chest over the edge to use the net, must also be taken into consideration in appreciating the position. The eggs were extremely handsome, two of them being especially so, having a ground colour of a beautiful pale flesh tint (almost pure pink), richly marked with red-brown. To give some idea of the persecution to which the Peregrine is subject, I may mention that this was the sixteenth bird shot by this keeper from nests on this fell.

Leaving the Peregrine's desolated home, we paid a visit to the Raven's nest on the other side of the fell, and inspected the raw-looking little creatures, now three days old, which were gaping vigorously beneath. The female Raven left the nest in a very different fashion to that adopted on the 29th ult., when she slunk away in the quietest manner possible; now she was very noisy, and flew around croaking during the whole of the intrusion. The male bird did not put in an appearance on either occasion. The Raven has bred on this fell for a great number of years, confining its choice to the sites on the eastern or western slopes. The Peregrine varies its choice between this fell and two other sites a few miles off, in all of which it fares very badly.

I saw an extremely fine variety of the Blackbird on Strensall Common on April 24th; the head and neck were pure white, and most sharply defined from the black of the body. Redshank, Teal, and Snipe were nesting on the Common in some numbers; but the place is too near York, and consequently is completely ransacked.

Migratory waders, on their way north, made their first appearance on the Humber "clays" on May 20th, when Sanderlings in partial summer dress and Turnstones in full breeding plumage were observed. On the 25th eight Dotterels (*E. morinellus*) and

nine Whimbrels were noted. But it was not until the 27th that the great rush from the south took place, when thousands of waders were to be seen.

The Dotterel when on its way north appears to be an extremely stupid bird. For some years past a party of them have repaired annually, in May, to an identical field on the Holderness coast, where they linger for about a fortnight, during which period they appear to know no fear, and should a local gunner appear upon the scene the lot fall an easy bag.

In May a nest and eggs of the Shoveller were found by a friend of mine on an extensive tract of heath in the vicinity of the coast. This is, I believe, the first undoubted record of the breeding of this species in Yorkshire.

Waders from their northern breeding haunts made their appearance on the coast early. A Knot, in summer dress, was killed under the Spurn telegraph-wire on July 23rd. Three Grey Plovers, an immense flock of Dunlins, and several Whimbrels were observed on the 25th. The first Sanderlings were seen on August 15th.

The year 1880 witnessed the destruction, by enclosure, of Riccall Common—a locality which, until the commencement of the present century, could claim the Ruff among its annual breeding birds, and since those palmy days has been the resort of Redshanks, Black-headed Gulls, Teal and other Ducks; but, alas! it has had its day, and Strensall, like it, is soon to follow suit. But while we are thus banishing certain species from old haunts, it is a pleasure to hail the return of others to former ones. Thus the Sheldrake, once not uncommon on the Holderness coast, has returned, and this year reared her young in safety; a brood of six were seen to issue from a rabbits' burrow, and on digging out the nest two addled eggs were found. Now that Spurn is so very strictly preserved, it is to be hoped that this species may become numerous there. This year has also seen the return of the Cormorants to the Flamborough cliffs, from which they were driven by the murderous times preceding the Sea-Birds Act.

An immature Black Tern was shot at Easington on the 28th August. This species, in the inconspicuous plumage of immaturity, is probably much overlooked; at all events it is not often reported. Redstarts and Wheatears swarmed on our coast-

line, as elsewhere, during the latter days of August. The Redstarts departed from Spurn, to a bird, on September 3rd. A white Martin, a true albino with pink eyes, was shot at Patrington on September 6th.

Some of the autumn immigrants put in an early appearance on our coast. Golderests were seen on September 13th, and a Short-eared Owl was shot on the 29th. Probably these very early arrivals are not from the Continent, but British-bred birds following the coast-line south along with our summer visitors.

On October 5th, the weather cloudy with passing showers, a considerable immigration of Golderests and Redwings took place on the Holderness coast. A male Great Grey Shrike was shot on the 6th, and sent to me in the flesh: the crop was filled with coleopterous remains, chiefly belonging to the genera *Geotrupes* and *Carabus*. A few Woodcocks and a more considerable immigration of Golderests occurred on the 9th, when the gardens on the southern portion of our coast literally swarmed with the latter species. The first Grey Crow was seen on the 10th. On the night of the 16th a large flight of Hedge Accentors arrived, the village of Easington being alive with them on the following morning; a few Common Wrens accompanied them. On the night of the 19th, when a keen frost prevailed, the first Fieldfares and Redwings put in an appearance, and were accompanied by a few Snow Buntings and Siskins. The last few days of October I spent with Mr. Cordeaux on the Holderness coast, when we made the following observations:—On the 26th a few migratory Goldfinches, old male Blackbirds, and a Short-eared Owl seen. 27th, wind strong from the E, cloudy with rain, a solitary Greater Spotted Woodpecker and a Long-eared Owl shot; Carrion Crows passing in great numbers from E. to W. at 2 p.m. On the 28th, after a strong N.E. gale, I shot a female Blackcap at Kilnsea; a Willow Wren was obtained at Flamborough on the same day; a considerable immigration of Fieldfares, Redwings, and Snow Buntings, and a few Siskins also occurred. Purple Sandpipers—a species which seems to be somewhat erratic in its visits to this portion of our coast—were not uncommon. Two Hoopers appeared at Crofton, near Wakefield, on the 30th, one of which was shot.

On November 5th a large flight of Scaups passed up the Humber. A solitary Swallow was seen at Spurn on the 17th.

A rather curious incident occurred at Spurn on the 22nd. Three Crows were observed disputing, on the wing, about a morsel which one of them, more fortunate than the rest, had managed to secure, when suddenly a Great Black-backed Gull appeared upon the field, and put in a claim, much to the alarm of the Crows, and resulting in the fortunate one relinquishing his capture, which fell upon the sands, and was secured by my informant before the Gull could pounce upon it. This bone of contention proved to be a Storm Petrel, just dead and still quite warm. I received this bird in the flesh on the day following, and on dissection it proved to be a male in emaciated condition; the lungs were considerably diseased, each containing a consolidated whitish mass, about the size of a small pea, showing on section the bronchial tubes running through the centre standing wide open. A question is here suggested as to the nature of the diseases in the lungs of undomesticated animals; and whether this mass was of a cancerous nature, or the result of acute phthisis? Many Storm Petrels occurred far inland during November, being blown off the sea and carried before the easterly gales which prevailed.

A fine adult male Bittern was shot in a stubble-field at Tunstall, near Withernsea, on December 15th. This bird weighed thirty-nine ounces, and the contents of the gizzard, sent to me for examination, consisted of a mass of coleopterous remains, including an entire head and elytron of a *Dytiscus marginalis*, and a stringy substance much resembling wet tow.

On December 30th an adult male Tengmalm's Owl was shot at Normanby, near Whitby, by some rabbit-shooters whose dog put the bird out of a broom-covert. This specimen was kindly sent to me for inspection by Mr. Wilson, of Whitby, in whose collection it now is. The bird agreed with the description given by Mr. Dresser, with the exception that there were *five* white spots on the tail-feathers, whilst Mr. Dresser only mentions four. This fifth spot, however, is not observable until the tail-coverts are raised. I also noticed decided traces of a sixth spot at the extreme end of each feather, but this was not very marked, owing to abrasion. Of the five Yorkshire occurrences of this species, three of them have been from the neighbourhood of Whitby: an adult now in the collection of Mr. W. Lister, of Glaisdale, was shot from a tree at Egton, on November 19th, 1872; whilst

one, which some years ago occupied a place in the Whitby Museum, was shot on Sleight's Moor about the year 1840. Unfortunately this specimen was badly preserved, and had to be destroyed.

NOTES AND OBSERVATIONS ON BRITISH STALK-EYED CRUSTACEA.

By JOHN T. CARRINGTON, F.L.S., AND EDWARD LOVETT.

(Continued from p. 50.)

Genus PINNOTHERES, Latr.

This genus embraces two British species, remarkable on account of their habitat being in the living shells of Bivalve Mollusca. The generic characteristics are as follows:—Carapace nearly round, hard in the male and soft in the female; anterior pair of legs nearly equal, with normally developed forceps; remaining legs having the terminal joint somewhat hooked and strong. Peduncles of eyes short. Abdominal somites seven in number in both sexes, those of the male being narrow, whilst those of the female are very broad; in fact, more so in proportion to the size of the animal than those of any pre-considered species.

M. Milne-Edwards includes four other allied genera in the family *Pinnotheridae*, and gives the localities for them as the Red Sea, Cape of Good Hope, and Australia.

Pinnotheres pisum, Latr.

This little crab, known as the common Pea Crab, is, as its name suggests, very small—the male being even smaller than an ordinary sized pea, whilst the female is about three times as large. The anterior portion of the carapace in the male projects, and there is a depression on the latero-posterior margin; whilst in the female the anterior part is rounded, and the depression is wanting. The forceps of the male are robust and strong, whilst those of the female are weak. As it appears that most probably it is the female that is most addicted to inhabiting the shells of Mollusca, this weakness of the forceps would be thus accounted for, as they would be but little required.

The colour of this species varies, particularly in the case of the male, which is usually of a pale yellowish brown, somewhat mottled; the female is yellow, with brownish markings, the brown sometimes having a reddish tinge. *Pinnotheres pisum* is found in the shells of several species of Mollusca. We have found it chiefly in that of the common mussel, *Mytilus edulis*, from Southend. This species is very generally distributed. It has been recorded from St. Andrew's, in *Modiolus modiole*; from Devon, in *Mytilus*, *Cardium*, and *Ostrea*; and Couch, in the 'Cornish Fauna,' says it is rare, and only found in the shell of the mussel, the natural inhabitant of which it either finds diseased or leaves it so. In Norfolk they are considered poisonous, and are known as "Swinards."

Pinnotheres veterum, Bosc.

This species, which is much rarer than *P. pisum*, is known as the Pinna Crab, and also as the Ancient Pea Crab. It is larger than the former species, being often of a length of five-eighths of an inch. In general habits it much resembles *P. pisum*, with the exception that it is found chiefly in the shells of the Pinna; in colour, too, it varies, this species being of an uniform brown tint, and devoid of the markings that characterise *P. pisum*; it is interesting to note that the tint of *P. veterum* corresponds in colour to the mantle of its host, the Pinna. The following is a short description of a specimen which we recently obtained from about thirty miles off the Devon coast, in deep water, from a Pinna:—Length of carapace, five-eighths of an inch. Colour of an uniform dirty umber-brown, with a darker tinge down the centre of the abdominal segments and the latero-anterior portion of the carapace. Eyes of a rich pink. Sex female. Abdominal segments extremely large and broad, covering the whole of the sternum.

It is recorded in the reports of the British Association from Devon coast; and in the 'Cornish Fauna' as rare on that coast.

As the fables of the association of the *Pinnae* and *Pinnotheres* of Pliny and other early naturalists are so well known, we need not do more than refer to them. That the crab finds the habitat in the Pinna-shell of advantage there can be no doubt, but it

seems very doubtful whether this advantage is mutual. We must not expect to find a crab in every Pinna-shell.

Gonoplax angulatus, Fabr.

This remarkable crab is a common Mediterranean species, but it occurs frequently on our southern and south-western shores. It fully justifies its popular name, "the Angular Crab," and its curious forms in this and other respects cause it to be one of the most interesting of the British Crustacea.

Its carapace is much broader than long, with the sides almost at right angles with the anterior and posterior margins, the former being nearly straight, with the space between the orbits slightly projecting. The anterior angles are armed with two spines, one on either side. The lateral margin has one spine only projecting, and not nearly so large as that at the angle. The first pair of legs are remarkably long, broadest at the base of the forceps, the latter long and toothed. The remaining legs long and attenuated, the last three joints of the second and third pairs being furnished with setæ on the edges. The eyes are fixed upon very long peduncles, which are capable of being turned back for protection beneath the anterior edge of the carapace so as to be quite hidden. Abdominal segments seven in number in both sexes; the third segment of the male is broader than the rest, and the posterior segments to this are form a triangle. Those of the female are oval, the fourth, fifth, and sixth being the broadest.

The colour of this remarkable species is yellowish or pinkish red, occasionally bright and coral-like in its tints, but most frequently dull.

We have as yet had no specimens in ova, and so cannot speak as to the date of spawning or the appearance of its ova.

This rare species is stated by Prof. Bell to have first been found in British waters by Montagu in the estuary of Kingsbridge, Devon; he also states that it has since been found on the coasts of Cornwall and Wales, as well as Ireland. In the 'Annals and Magazine of Natural History' for 1870 this crab is recorded from the Isle of Mull, its first appearance in Scotland. From the reports of the British Association we gather that it has been taken on the Cheshire coast (rare), South Devon (occasionally), and Dublin (rare). In the 'Cornish Fauna' we learn that it is

common off that coast in undoubtedly deep water.* Prof. Celler says that it occurs at the Cape of Good Hope. We have obtained it from Weymouth and Torbay, off both of which parts of the coast it is not unfrequently found. The localities given by M. Milne Edwards are the north-western and southern coasts of France. It is said to be a very favourite food of many fishes, particularly the Cod.

We were told by the Penzance and Newlyn fishermen that they only get this crab when the trawlers are beset by calm, so that the trawl remains still for a time on the bottom of the sea. These fishermen consider that *Gonoplax* is then tempted by the fishy smell of the net to enter through the meshes, which are tightened when being drawn up, and so closed as to prevent the escape of the crabs.

Planes Linnæana, Leach.

This crab can only be said to be British from the fact that specimens are washed ashore on our coasts occasionally, "*nolens volens*," in the same manner as are sometimes tropical seeds. Its true home is no doubt the Sargasso or Atlantic Gulf-weed (*Fucus vagans*), but it has also been found attached to the bodies of Turtles.

P. Linnæana is a curious-looking species; its carapace is nearly square, with the posterior angles rounded, and the anterior angles replaced by concave cavities to receive the eyes, which are fixed upon stout peduncles. The antennæ are very small. The posterior legs are nearly equal, robust, and having the arm toothed. The remaining legs are flat and clothed with setæ. The abdominal segments are seven in number in both sexes, those of the male triangular, and of the female circular.

* In the 2nd edition of the 'Fauna of Cornwall,' 1878, the section on Crustacea, originally written by the late Mr. Couch, was edited by Mr. C. Spence Bate. At p. 72 Mr. Bate says, after *Gonoplax angulatus*, "Mr. Couch next describes a very doubtful species under the name of *Gelasimus Bellii*, which Mr. Bell thinks may be the young of Roux's *Gonoplax rhomboides*, which most carcinologists consider as a variety of *G. angulata*." Then follows Couch's description in full, the chief points of difference being, "Foot-stalk of the eye long and slender, the transparent cornea small. Carapace resembling that of *Gonoplax*, but more advanced in front and less extended laterally."

The colour is greyish or pale yellowish brown, some specimens having a mottled appearance.

In the report of the British Association, 1867, this crab is recorded as occurring off the French coast, attached to the under side of the Hawk's-bill Turtle. In 'Cornish Fauna' it is recorded as being a "stray inhabitant" of the coast of that county. It is also recorded from the Devon shores by the Devon Association.*

In November, 1881, we received, through the kindness of Mr. Stephen Clogg, a remarkably fine specimen which that gentleman obtained amongst the stalk-barnacles upon a balk of timber that had been thrown up on the shore at Looe, Cornwall. The specimen, which is exceptionally large, is seven-eighths of an inch each way over the carapace. In the present volume of 'The Zoologist' (p. 118) Mr. Cornish records the capture of seven specimens near Penzance, from amongst soil and sea-weed growing on a derelict cask of paraffin found floating at sea. Mr. Cornish having kindly presented to us two of the specimens, we find them smaller and darker than that above recorded.

Genus EBALIA, Leach.

This genus, which is a very decided one, includes three species that are not only British, but in all probability peculiar to our seas; for M. Milne-Edwards in his description of them does not give any other locality. They are commonly known as the "Nut Crabs," and their generic characteristics are as follows:—

The carapace is roughly diamond-shaped, with the angles rounded or elevated, the size of it rarely exceeding five-eighths of an inch by half an inch. The anterior pair of legs more or less robust in the different species, as we shall describe. Antennæ very small, as also are the eyes. Abdominal segments seven in number in both sexes.

* *Grapsus pelagicus*, Prideaux. The reference to this crab occurs in 'Cornish Fauna' (p. 74), where Mr. Couch says: "A species of the genus *Grapsus* is in the Athenæum at Plymouth under the name of *G. pelagicus* by Mr. Prideaux, and known to Dr. Leach, but not in any published work. It is understood that the collection in the Museum of that Institution is confined to the specimens taken on the borders of Devon and Cornwall." This is now usually considered by carcinologists to be a variety of *Planes Linnaëana*.

Ebalia tumificata, Mont.

This species, like *E. Cranchii*, differs from *E. tuberosa* in that its carapace is much more flat and hollowed, but to this we must except the female of this species. The lateral margins are prominent and rounded, with a flat sharp edge, whilst on the anterior margin are two small projections immediately above and between the eyes. Of the three prominences situate on the thorax, one is proximate to the posterior margin, while the other two are centrally placed between the fore and hind margin, one on each side of the medial ridge. It is these two that in the female are so remarkably different in appearance, from their globose and swollen form, as to almost decide in the mind of the student its specific value, as no such difference occurs in the other two species to be described. The anterior pair of legs are depressed, warty, and broad. In the abdominal segments the fourth, fifth, and sixth joints are united. The size of this species rarely exceeds half an inch across the carapace, and its colour usually of a pale dull pink or yellow, occasionally speckled with red.

Although this species is rather rare, it is recorded by Prof. Bell from Weymouth, Exmouth, Plymouth Sound, Belfast, and off the Mull of Galloway. According to the reports of the British Association, it has been taken on the coasts of Durham and Yorkshire, as well as from the Hebrides, and a single specimen from Shetland; and is, according to the 'Cornish Fauna,' rare in that county. We have obtained it, in company with the former species, from Guernsey, in comparatively deep water, where it clings to the Algæ; also from mid-channel off the Sussex coast, and occasionally from South Devon.

So far as we have observed, it is with ova in the early months of the year, so that it would spawn in the spring. This ova greatly resembles that of *E. tuberosa* both in colour and size.

Ebalia Cranchii, Leach.

The carapace of this species strongly resembles that of the male of *E. tumificata*, each of which species has the ridge from the anterior to the posterior margins more prominent than the transverse one, thus being unlike *E. tuberosa*; it is very finely granulated, and has two additional tubercles to those of the

former species, which are more forward and closer to the medial ridge; it is these additional tubercles that are its chief specific feature. The anterior pair of legs are very long in the male, robust, and having the forceps slightly serrated. The female has these limbs of the normal length, while the carapace is similar in both sexes.

This species is considered by Bell to be the most rare of the British *Ebalias*; he gives it as having occurred at Plymouth Sound, the Frith of Forth, Connemara, and Belfast Bay. It has also been recorded from St. Andrew's; Galway (common); Dublin (rare); Aberdeen; the Hebrides; Moray Frith; and the coast of Northumberland. It is said to be rare in Cornwall. We have obtained it from off Torbay and Start Point, in which locality it is not unfrequently found.

Ebalia tuberosa, Pennant.

This species is the largest of the genus, and may be distinguished by several decided specific features. The carapace is raised and divided by two rounded ridges crossing each other from the four angles; it is roughly granulated and of a reddish brown colour, though in favourable localities it often assumes a much brighter tint. The anterior pair of legs are robust, and, like those of *E. Cranchii*, are rounded, carinated slightly, and have the forceps serrated; the remaining legs are simple. The abdominal segments of the male are long and narrow, having also the third, fourth, fifth, and sixth joints "soldered" together; those of the female are broad and rounded in form.

According to Prof. Bell, this species, although less rare than the preceding ones, is by no means common; but as their habitat is the coralline zone preferably, this may to some extent account for their apparent rarity. We have obtained it in considerable numbers from Guernsey, the South Devon coast, and from mid-channel off the Sussex coast. Those from the latter locality were remarkably fine specimens, and one had a young oyster, about one-fourth the size of the animal itself, attached to its carapace. In Jersey we observed it to be somewhat scarce.

In Bell's work it is recorded from Devon, Dorset, Berwickshire, Cork, Belfast Bay, and off the Mull of Galloway. It has also been taken at St. Andrew's and Shetland (at the former

place often in fishes' stomachs); according to Couch, it is "not common" in Cornwall.

Its ova are small and of a golden colour, being exuded during the early part of the year.

Atelecyclus septemdentatus, Leach.

This remarkable crab may be readily recognised by the circular form of its carapace; hence its popular name, the "Circular Crab." It is the only species of the genus known to occur in our seas, and the following may be taken as a general outline of its description:—

Carapace, as we have already stated, almost circular, the posterior margin being, however, flattened; lateral margins regularly and evenly serrated; orbits slight, and having two notches in their cavity; space between the orbits armed with three even denticulations; carapace generally convex, with the regions decidedly but not harshly defined. Antennæ well developed and plumose, somewhat resembling those of some of the Lepidoptera.

The anterior pair of legs are massive and broad, capable of closing together beneath the cephalo-thoracic portion of the animal; they are armed with rows of small tubercles and warty prominences. The forceps are curved so that they cross at the tips; they are brownish black in colour. The remaining legs do not differ much from the normal form, except that they are closely fringed with hair, as also is the carapace and anterior pair of legs. The abdominal somites are five in number in the male and seven in the female; it is remarkable that the female segments are not so broad in proportion as is the case with most of the *Brachyura*; from this it would appear as if the ova were not so much in need of that protection which is so necessary to other species. The colour of this crab is a very pale yellowish white, speckled over with a brick-red tint. The hair-like fringe is a pale warm brown.

This species is evidently a deep-water one, for, according to Bell, it is common in the stomachs of fishes from a depth of twenty to fifty fathoms. He records it from the coast of Devonshire, the Welsh coast, and Scarborough; as well as from the Frith of Forth, Scotland, and several localities in Ireland. We have received this species from Milford Haven; also obtained several specimens by dredging off the South Devon coast in about thirty fathoms of water.

(To be continued.)

OCCASIONAL NOTES.

WHITE STOATS.—Whether it is that during a winter when much snow falls these creatures are not so easily seen, or that at such a time they are not so much abroad, I am not prepared to say, but it always seems to me that a mild winter is the most productive of these animals in their white or partly white garb, and the past mild season has helped to confirm my supposition. In this neighbourhood they have been met with in comparative plenty in all stages of change, and some of them have been very prettily marked, reminding one at first sight of a spaniel dog. One I saw—a very large specimen—appeared at a short distance to be of an uniform gray colour on the upper parts, and lighter underneath, but on closer inspection it proved that brown hairs were scattered amongst the white all over the body, which gave it such a peculiar appearance. This was probably an old one, as its teeth were very much broken and decayed. The most remarkable that has come under my notice was one wholly white except the characteristic black tips to its tail. It is the first I have ever seen not having some indications of the dark summer coat. It is my usual experience that if the body is perfectly white, the head in a greater or less degree shows some marks of the dark dress, and especially on the crown; but the specimen in question has no such markings, for except a few scattered gray hairs about the eyes, its head is as uniformly white as the rest of its body. I may mention that its eyes were of the usual dark colour. Has the unusual occurrence of these creatures during the past winter been noticed by other correspondents?—G. B. CORBIN (Ringwood, Hants).

THE LESSER HORSE-SHOE BAT (*Rhinolophus hipposideros*) IN YORKSHIRE.—I have to record an interesting addition to the bat-fauna of Yorkshire, specimens of the Lesser Horse-shoe Bat having been sent me by Mr. Henry Laver, of Colchester. They were collected in January, 1876, in a cave near Eavestone, Ripon, a very wild and exposed part of the country, 700 feet above sea level, and sent to Mr. Laver by Mr. James Ingleby, of that place. I have had some correspondence with Mr. Ingleby on the subject, and he informs me that the species is the prevalent one of his neighbourhood, the others occurring there but sparingly in numbers. Of the Long-eared Bat, which in some parts of Yorkshire is the commonest species of all, he has only found one or two examples, while the Whiskered Bat, which I recorded in 'The Zoologist' for April, was the first of the kind he ever saw. I fully agree with Mr. Laver's determination of the species as *R. hipposideros*.—W. DENISON ROEBUCK (Sunny Bank, Leeds).

VARIETY OF MOLE.—Some years ago I sent a note to the pages of 'The Zoologist' on the occurrence, in this neighbourhood, of a few specimens of "cream-coloured" Moles. Since last autumn I have seen several specimens of a similar colour, suspended with many of their black relations upon the bushes which the Mole-catcher appropriates as a gibbet for his captures. Perhaps the term "cream-coloured" scarcely describes the variety in question, for although the upper parts of the body are of a creamy buff hue, yet all the under parts are of a brownish red, or brownish orange colour. I believe I have seen the record of the occurrence of similar varieties in several other localities, but are they of general distribution, and do they occur regularly or only at intervals? In this neighbourhood they are somewhat uncertain in their appearance, and seem to affect particular localities. —G. B. CORBIN (Ringwood).

OCCURRENCE OF THE GREY SEAL OFF THE NORFOLK COAST.—On December 24th, 1881, one of the Trinity pilots, whilst in the neighbourhood of the Long Sand in the Lynn Roads, saw a very large Seal, watching over the dead carcase of a recently-born young one. On attempting to capture the old one she immediately showed fight, and had to be killed before she could be secured. Through the kindness of Mr. F. J. Cresswell and Mr. Garrod, of Lynn, I have had the opportunity of examining the skins of both individuals, which are unquestionably those of the Grey Seal, *Halichærus gryphus*. The old female measured seven feet one inch in total length, and five feet nine inches in girth behind the fore flippers; the claws were very long, the first two measuring two inches and a-half and two inches and a-quarter respectively. The general colour was yellowish buff, indistinctly with spots and blotches of dark brown. The young one was a beautiful silvery white, the muzzle sooty grey, a slight tinge of the same colour being visible on the back of the head and for some distance along the spine. Unfortunately the skull of the old Seal was not preserved. I have for some time suspected that this species occasionally visits the sands in the Wash, as I have heard of large Seals being seen or killed, which could scarcely be any other than the Grey Seal. Mr. Cordeaux also tells me that some years ago he saw on the same sand a large Seal, which he believes belonged to this species; it was in company with several Common Seals and "was a veritable Triton amongst the Minnows, looming like a big bullock in the haze."—T. SOUTHWELL (Norwich).

NESTING OF THE LONG-TAILED TITMOUSE.—I should like to ask other observers at what height from the ground the nest of the English Long-tailed Tit (*Acredula rosea*) is generally placed? There is now in a large oak tree of mine here, a Long-tailed Tit's nest, at least fifty feet from the

ground. My experience in Holland led me to think that *A. caudata* always, or nearly always, built its nest some way from the ground, and generally in the fork of an oak branch. In Corsica also, I should say, that *A. Irbii* builds at about the same elevation as the last-mentioned species. But my experience of *A. rosea* is that the nest (and I have found a great many) is not placed more than from five to twelve feet high, and then generally in a hedge-row or blackthorn bush. It may be said, with regard to the nest that I am here referring to, that circumstances alter cases—such as lack of suitable or ordinary positions for the nest, abundance of vermin, &c. Now suitable hedges are in the near neighbourhood of the oak tree in which the nest is placed, and my cats (Persian) never go birds'-nesting. Macgillivray (ii. p. 457) says of *Mecistura longicaudata*, that the nest is "supported by the twigs or branches of a tree or bush, sometimes at the height of many yards, but not unfrequently very near the ground." Prof. Newton (Yarrell, i. p. 506), writing of *A. caudata* (apparently not recognizing *A. rosea* as a species), says the nest is "sometimes even high up in the fork of a tree." Mr. Dresser, in his 'Birds of Europe,' gives no special heights for the nests of the different species of European Long-tailed Titmice. In 'The Ornithology of the Straits of Gibraltar' *A. Irbii* is said to nest at "about fifteen to sixteen feet from the ground." Temminck, obviously describing *A. caudata*, says (Man. d'Ornithologie, 1st ed., p. 174), "Construit avec assez d'art un nid à quelque distance de terre et posé sur l'enfourchement des branches." Again, Degland et Gerbe (i. p. 571) say, "Elle niche sur les buissons, dans les tailles, les vergers, contre le pied des grands chênes. Son nid, qu'elle établit à une elevation mediocre." Now I should like to ask, Is there any difference in the nidification between our species of *Acredula* and those species belonging to the Continent? I confess I believed there was, but now my theory is overthrown. Needless to say that if any ornithologist who reads this, happening to be in the neighbourhood, cares to look at the nest referred to, I shall be very pleased to show it to him.—C. BYGRAVE WHARTON (Hounslow, Totton, Southampton).

BUFFON'S SKUA IN THE CHANNEL ISLANDS.—As this bird has not hitherto, I believe, been recorded from the Channel Islands, I send you the following note of its occurrence in the island of Herm. In November 1881, Mr. Jago, a birdstuffer in Guernsey, wrote to me as follows:—"A female Skua was found dead in Herm on the 29th October; it was very thin, but in good plumage; it is very like the Pomatorhine, but much smaller, being about the size of a Kittiwake; I think it is Richardson's." I did not record this supposed occurrence of Richardson's Skua in 'The Zoologist' at the time, as I was a little doubtful as to the identity. Mr. Jago, however, forwarded the bird to me a few days ago, and it turns out to be a Buffon's Skua, *Stercorarius parasiticus*, a young bird of the year. I have

carefully examined it and compared it with others, both of its own species and with Richardson's Skua, and have no doubt as to its identity, for besides its considerably smaller size, it has the shafts of the first two primaries only white, the rest being decidedly darker: this is Mr. Howard Saunders's test, and seems perfectly reliable at all ages, though in some specimens the shafts of the third and following primaries do not seem to be quite so strongly marked as in others, but always sufficiently so to distinguish the bird from Richardson's Skua. Mr. Jago, in his letter to me, describes it as very like a young Pomatorhine Skua, but smaller: this is as nearly as possible Mr. Dresser's description of the young bird in the 'Birds of Europe,' where he says it differs from the young of *Stercorarius crepidatus* in being much darker, and in colour resembles more the young of *Stercorarius pomatorhinus*. This seems also a perfectly good distinction in young birds, but I should think it doubtful in intermediate stages. It is not included in Professor Ansted's list, nor have I been able to hear of any other occurrence of this kind in the Islands.—CECIL SMITH (Bishop's Lydeard, Taunton).

ON THE NOTE OF THE NUTHATCH.—Why one of the sounds made by this bird is called "churring" by Mr. Young (p. 113), and by the Rev. O. P. Cambridge (p. 149), I do not know; but I am quite confident that the sound referred to by both the above writers emanates from the Nuthatch, and *not* from the Lesser Spotted Woodpecker. The former (locally termed the "Mud-dabber") is very common in the New Forest, where the Lesser Spotted Woodpecker is comparatively rare, though I have had fair opportunities of observing both species. Anyone reading the article by the Rev. C. A. Johns on the Nuthatch, in 'British Birds in their Haunts' (p. 311), will not doubt for a moment that the note referred to in the above-mentioned letters was that of the Nuthatch.—C. BYGRAVE WHARTON (Hounslow, Totton, Southampton).

EIDER DUCK AT SCILLY.—An Eider Duck was recently taken by Mr. Dorrien Smith at the Scilly Islands. It is a male bird in perfect plumage, and has been forwarded to Mr. W. H. Vingoe to be set up. Mr. Dorrien Smith's gamekeeper recollects having obtained another specimen of this bird there some years since, but the occurrence does not appear to have been recorded.—THOMAS CORNISH (Penzance).

IMITATIVE POWERS OF THE HAWFINCH.—I do not recollect having seen any notice of the imitative powers of the Hawfinch, *Coccothraustes vulgaris*, and therefore subjoin a few words on the subject. A bird of this species, now in his third year (which I brought up by hand), constantly imitates the "sweeting" and "clucking" sounds with which I have talked to him and other birds. In his youth, and especially during his first moult, he used to "record" in a low tone a few notes, probably those which he heard in the

nest from his parent. Unfortunately he dropped this true song, in favour of the slightly eccentric noises aforementioned, to which he has recently added the piercing whistle of a Gray Parrot. Devoted to insects, particularly in the summer months, he nevertheless, of late, has shared all dainties with a timid Grey Cardinal, with which he paired. He invariably cracked all hemp-seeds before presenting them to her, and exhibited the deepest concern when she died in moult last autumn. Only in the matter of the first bath in the morning did he insist on holding his own. They lived together on the happiest terms for two years, though they both resented the intrusion of any other birds into their cage. This Hawfinch constantly repeats his own name, "Jock," though the J baffles his efforts sadly.—H. A. MACPHERSON (120, Westbourne Terrace, W.).

HOODED CROWS IN HAMPSHIRE.—From various notices in recent numbers of 'The Zoologist' it seems that Hooded Crows, both native and migratory, have been very plentiful in many localities. It is not altogether a frequent winter visitor to this immediate neighbourhood, yet its occurrence at that season is by no means rare; during the past winter, however, it has been unusually abundant, so that many casual and disinterested observers have noticed its appearance, or seen its mischievous depredations. The first I saw was about the middle of October, but since that date I have seen a most unusual number for this locality, and several gamekeepers tell me that the birds display a considerable degree of cunning in avoiding snares and traps prepared for their especial destruction. How can their occurrence be accounted for in this neighbourhood during such a mild and spring-like winter? With such interesting and able articles as we often get in these pages from well-known pens, our knowledge of the migration of birds must necessarily increase, yet it seems that the more we know of the subject the wider grows the field for investigation and research. The winter of 1880-81, from its severity, caused many northern birds to visit us in great numbers, whilst the "hoodies" were comparatively few, or at least no commoner than in ordinary seasons. How different the experience of the past mild winter! The great bulk of "visitors," and especially waterfowl, were rare or entirely absent, but the species (or variety) in question came to us in unusual quantities, and yet I suppose the same instinct and laws of migration actuate the movements of each and every individual of the feathered race.—G. B. CORBIN (Ringwood).

KITE IN CORNWALL.—Very recently a Kite was shot at Clowance, near Camborne, the seat of the Rev. St. Aubyn St. Aubyn, I believe by his keeper. A Kite (probably the same bird) had been previously seen by Mr. R. G. Lakes at Trevarrack, St. Austell; and shortly afterwards a Kite (probably the same bird) was seen by Mr. E. Vingoe at Scorren, near Redruth. The specimen killed at Clowance, which proved to be a male in

excellent plumage, is now in the hands of Mr. W. H. Vingoe, of Penzance, for preservation.—THOMAS CORNISH (Penzance).

BLINDNESS IN THE CODFISH.—Fishes, as a rule, are provided with two eyes, symmetrically placed one on either side of the head, while they are undoubtedly large as compared with what obtains in other vertebrates, or even in comparison with the extent of surface in their own bodies. Their size, however, is modified in accordance with local surroundings and their habits. Some frequent muddy waters, where vision would be of less service than tactile organs; in such cases appendages for feeling, as barbels, are more developed than eyes. Others again are restricted to living in dark caves where rays of light can hardly enter. Irrespective of the foregoing cause of atrophy there are many forms residing in the dismal abysses of the ocean where light is unable to penetrate, for solar rays are computed to be lost at a depth of two hundred fathoms or less; while in the fresh waters of the Lake of Geneva, Prof. Forel ascertained that at thirty fathoms photographic paper was entirely unacted upon. Another modifying influence is whether the habits of the fish are nocturnal or diurnal, the former, unless residing in dark places, requiring the larger organs of vision. Active animals residing in the light are provided with eyes, while those having limited powers of progression and residents in the dark are usually more or less deficient in these organs. They may consequently be present in almost the lowest animal forms, and absolutely wanting in some of the higher, as the Shrew Mouse and the Mole. Eyes likewise may be only rudimentally developed, as in the *Amphioxus* or *Myxine*, wherein they appear as mere dark specks, but still have a nerve distributed to them. Or they may have retrograded to so considerable an extent as to be entirely absent in some forms which have taken up their abodes in dark caverns, but even here the lens and other constituent portions of the eye may usually be detected, whereas examples of the same species living outside are provided with fully formed eyes. When we commence investigating the relationship which exists in fishes' eyes to the localities they reside in or their general habits, we must be struck by the fact that some forms live where the rays of solar light are absent, others in the glare of the sunshine. But I do not purpose entering in detail into the organs of vision of fish and their numerous modifications, but to restrict myself to whether light can have such a modifying influence on the eye of the Codfish as to occasion morbid symptoms and even total blindness. In the thirteenth volume of the 'New Sporting Review' exists a most interesting account of a visit to Colonel McDowell's vivarium for Codfish in the Mull of Galloway. An excavation was formed in the rock about fifty feet in diameter, and at low tide about eight feet of water remained in this basin, and six feet more at high tide. It was

observed as a curious fact that fish when they have remained long in this pond always became blind; this was supposed by Colonel McDowell to be due to there being insufficient shelter for them from the heat and glare of the sun, owing to the shallowness of the water as compared with the depths of their usual haunts. The various members of the Cod family appear to be very susceptible to disease, especially of the vertebral column, and during the past year, when visiting an aquarium in the north, supplied with pure sea water, I observed several of these fishes blind with one or both eyes. The eyeball in those which were totally deprived of vision moved on the blind similar to that on the sound side. In some examples of the Common Cod, *Gadus morrhua*, the pupil instead of being circular was transversely oval, or even pear-shaped, probably due to an adhesion of the posterior surface of the iris to the lens or its covering. The pupil was either dull or greenish, while in some a film appeared to cover the eye. Without the opportunity of examining these eyes it would be difficult to determine the exact lesion, but I am disposed to think that the theory advanced at Colonel McDowell's was the correct one. I was lately observing a fine school of Bibs, *Gadus luscus*, which had been upwards of eighteen months in the Westminster Aquarium, where the water had not invariably been particularly clear, nor had all of it come direct from the sea. Here numerous cases of blindness were not apparent. Before, however, attributing this immunity entirely to the character of the light, we have to consider the relative susceptibility of such in the Common Cod to what obtains in the Bib. The Cod, although hardly a deep-sea fish, resides in localities at one hundred to one hundred and fifty fathoms, while the Bib, although it lives in deep waters during the winter, approaches the shore in spring and summer, consequently does not so invariably remain in dark or semi-dark places as does the Cod. Before offering any opinion on the frequency and probable cause of this blindness among members of the Cod family while in confinement, it would be interesting if managers of various aquariums would let us know whether they have observed such cases in the establishments under their control. If so, the time at which they commenced as well as the clearness and depth of water in which the fish have been kept.—FRANCIS DAY (Cheltenham).

RARE FISHES ON THE CORNISH COAST.—I have received the Lesser Weever, *Trachinus vipera*, from a new locality. This is the first specimen I have ever seen, although I have heard of it as occurring in Pra-Sand in Mount's Bay, and in Hayle Sand. This specimen was taken out of some hard lug-sand just westward of Laregan Bridge, Penzance. I have again received a Dorset, *Gadus callarius*, taken in Mount's Bay. This specimen was sent to me as a present by the fisherman who caught it, and who considered it to be a Cod in very fine condition. I have also obtained a

Lump-fish, *Cyclopterus lumpus*, of very large size. It is remarkable that during the whole of my experience I have never (judging by colour) seen a male or red Lump-fish. The female or blue Lump-fish occurs frequently. I received a second female taken in the mackerel drift-nets, and on the 5th April my boatman caught another in a very singular manner. He was fishing at night in the Bay, with his brother, when they observed something phosphorescent making its way towards their boat on the surface of the water. As it passed them my man struck it with the gaff and secured it. It turned out to be a blue Lump-fish of large size and shotten.—THOMAS CORNISH (Penzance).

THE TORPEDO ON THE YORKSHIRE COAST.—A specimen of the Torpedo, *T. hebetans*, the first that has occurred on the shores of this county, so far as I have been able to ascertain, was captured while among the breakers on the beach at Easington, on the 14th April, and kindly sent to me for identification. In length it measured two feet five inches, and was one foot five inches from pectoral to pectoral at its greatest width. The fish was in a dying condition when caught, and no shock was felt by its captors.—W. EAGLE CLARKE (Leeds).

MEMOIR OF THE LATE CHARLES DARWIN, LL.D., F.R.S.

THE name of Charles Darwin has so long been a "household word" that the news of his decease, which took place on April 19th, will be received with profound regret by the entire civilized world. At the ripe age of seventy-three, in the arms of those nearest and dearest to him, he passed calmly and peacefully away, full of honours, and leaving behind him an illustrious and imperishable name.

The studies and researches which contributed to render his name so famous appear to have been commenced at an early period of his life, when, meditating the pursuit of medicine as a profession, he was sent to Edinburgh, then at the height of its reputation as a medical school, and in the University of which city his grandfather, Dr. Erasmus Darwin, had taken his degrees. After two years of study there he proceeded to Cambridge, where in due course, at Christ College, he graduated B.A. and M.A. Finding about this time that his private means were sufficient to render him independent of a profession, he abandoned the idea of adopting the practice of medicine, and devoted himself, from the love of it, to the study of Biology.

Although known at this time to only a small circle of scientific friends, his abilities as a naturalist soon became more widely recognised; and in 1831, when the Hon. Capt. Fitzroy—afterwards better known as Admiral Fitzroy, of meteorological fame—was ordered, with the 'Adventure' and 'Beagle,' to survey the coasts of Antarctic America, Charles Darwin was appointed Naturalist to the Expedition.

He sailed in December, 1831, and returned in October, 1836, during which interval he visited the Straits of Magellan and the coasts north of that Strait, and crossed the country from Valparaiso to Buenos Ayres, visiting besides the Galapagos, Ascension, the coasts of Australia, and other regions touched by the vessels during their voyage. In every locality visited he made large and important collections of rare or new animals and plants, recording in his journal a mass of valuable notes to be afterwards utilised. His services on this expedition were highly appreciated by Capt. Fitzroy, who paid a deserved tribute to his merits when receiving the medal voted him by the Royal Geographical Society; and the esteem in which he was held by his fellow voyagers has been fitly perpetuated in the names bestowed on Port Darwin in North Australia, and Darwin Mount and Sound, in Tierra del Fuego.

On his return from this expedition he settled at Down, near Beckenham, in Kent, where he has ever since resided, and where he commenced and prosecuted those literary and scientific labours which have since procured for him a world-wide reputation. In 1839 appeared his 'Journal' of a Naturalist, giving a narrative of his voyage, and written in a style so pleasing, and withal so instructive, that it has maintained a popularity to this day, and is regarded as quite a model work of its kind.

Between 1839 and 1842 appeared the official 'Zoology of the Voyage of Her Majesty's ship Beagle,' in four quarto volumes, by "various eminent hands," though the whole work was edited by Mr. Darwin, and the habits of the animals and their range were given by his own pen. In this work, for the first time, were described those great mammals of geological ages which are found on the Argentine Pampas, in addition to a series of observations on almost every other group of mammals. Not to enumerate many detached memoirs of interest, the next conspicuous work of

Mr. Darwin was 'The Structure and Distribution of Coral Reefs' (1842-46), in which was enunciated the theory of their growth which is now generally accepted. This treatise was the first part of the Geology of the 'Adventure' and 'Beagle'; the 'Geological Observations on Volcanic Islands' (1844) formed the second volume; 'Geological Observations on South America' appeared in 1846, as the third section of the work; and this, with the exception of a number of detached papers, may be said to have completed the formal systematic account of the task he had officially undertaken between 1831 and 1836. 'A Monograph of the Fossil *Balanidæ* and *Verucidæ* of Great Britain' (1854), published by the Palæontographical Society, was an elaborate and laborious treatise on the extinct Barnacles; while that on 'Fossil *Lepadidæ*' (1851), published three years before, referred to another section of the same group. In the same year he also published, through the Ray Society, a monograph of the living forms of Barnacles.

But the treatises here enumerated were merely the forerunners of that work which, more than any other, has made the name of Darwin famous, namely, 'The Origin of Species,' which appeared in 1859, and which in its turn became the preface, as it were, to the elaborate series of works which at intervals followed it. The theory, as set forth in this remarkable volume, of the evolution of species from a few simple organisms, by a system of natural selection, is now too well known to require comment, but the circumstances which led to its somewhat premature publication may be briefly referred to.

In 1858 Mr. Alfred Russel Wallace, who was exploring the Malay Islands, sent home a paper describing his own views as to the "Origin of Species." Sir Charles Lyell and Dr. Hooker on reading it were struck by the fact that Mr. Wallace had arrived at conclusions almost identical with those which Mr. Darwin had already communicated to them. It was felt that delay would no longer be fair to Mr. Wallace, or just to Mr. Darwin, whose manuscript was still unpublished. Accordingly, on the 1st July, 1858, papers by both authors were read to the Linnean Society, and from that period must be dated the birth of the "Darwinian Theory," though it was not till the 24th November, 1859, that Mr. Darwin's 'Origin of Species' appeared.

In 1862 was published 'The Various Contrivances by which Orchids are Fertilised,' and, 1865, 'The Movements and Habits

of Climbing Plants,' both works of the highest botanical value. In 1868, 'The Variations of Plants and Animals under Domestication,' and in 1871 'The Descent of Man' revived the controversy regarding the character of the Darwinian doctrines which had been occasioned by the appearance of 'The Origin of Species.' 'The Expression of the Emotions in Men and Animals' did not do much to allay this, though none could deny that the author had enriched knowledge with a marvellous series of curious observations. In 1875, 'Insectivorous Plants,' describing the carnivorous propensities of certain plants, *Drosera*, *Dionæa*, &c., contained another excellent series of botanical observations. 'The Effects of Cross and Self Fertilisation' (1876), 'The Different Form of Flowers on Plants of the same Species' (1877), and 'The Movements of Plants' (1880), at once proved Mr. Darwin not only to be an ingenious theorist, but the first physiological botanist of his age. Finally, in 1881, his now familiar treatise on the Earth-worm and its ways has only served to enhance his reputation.

Whether his now well-known theory of evolution will meet the fate of others which have preceded it, or become more enduring amongst scientific doctrines than the views of Lamarck and the author of 'The Vestiges of Creation,' it is of course impossible to say; but the impetus which his various works have given to modern thought and research, and the extraordinary number of biological facts which have been collected and brought to light by his untiring industry, will cause naturalists of every nation to be for ever indebted to him.

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

LINNEAN SOCIETY OF LONDON.

March 16, 1882.—Sir JOHN LUBBOCK, Bart., M.P., F.R.S., President, in the chair.

Messrs. H. M. Brewer, V. I. Chamberlain, and A. P. Withiel Thomas were elected Fellows of the Society.

Mr. Worthington G. Smith called attention to certain very destructive Australian Fungi new to England, viz., *Capnodium australe*, fatal to conifers, especially *Thuyas* and *Isaria fuciformis*, a great pest to grass in Kent and Sussex. The latter plant is popularly supposed to induce a

disease similar to diphtheria, and said to be fatal to cattle. *Isaria* frequently grows on animal substances, dead and living, as on larvæ and pupæ of ichneumons, spiders, moths, wasps, &c.

Mr. Smith showed a bee caught alive in this country, and having a profuse growth of the *Isaria* condition of the *Cordiceps sphecocephala*, a W. Indian form, the latter genus being closely allied to *Clavieps*, or Ergot.

Dr. Francis Day read a paper upon the *Salmones* found in the British Isles, remarking how great changes are occasioned by retaining any of them in unsuitable localities. He objected to the augmentation in number of the British forms of non-migratory Trout from three to seven, as made by Dr. Günther, holding that we possess only two:—the Loch Leven Trout, which is in reality a marine form acclimatized to fresh water, whereas the remainder are solely local races of the common Brook Trout. A most interesting fact was brought forward, *viz.* that Mr. Arthur, in New Zealand, having lately examined the Trout which were introduced there in 1869, from ova originally obtained from the Thames and the West of England, found great structural changes had taken place. The fish in question, moreover, living in different streams in New Zealand, had also assumed local peculiarities of size and change of form; and, due doubtless to increased food, the annual increment of weight had risen from $1\frac{1}{2}$ to $2\frac{1}{2}$ pounds, and an example had been seen weighing 20 pounds. The cæcal appendages, hitherto held as significant of species, were found augmented from 33 to 50, as exemplified in British fish, to from 43 to 54 in the New Zealand examples, showing that these organs are inconstant in number. Having alluded to the different species, Dr. Day concluded that, as the various species of non-migratory Trout, accepted by Dr. Günther, interbreed, and the hybrids are not sterile, the fact gives increased reason for supposing these various forms are merely local races, and not different species; that if they are really distinct species, division has not proceeded sufficiently far, because the Gillaroo, a form of Trout with a thickened middle coat of the stomach, has been termed *Salmo stomachicus*, Günther, whereas the Great Lake Trout with a thickened stomach, and the Charr, having a similarly transformed organ, have not yet been differentiated into species. Dr. Day considers that all our non-migratory freshwater Trout (excluding the Loch Leven) are merely local races; that interbreeding will produce mongrels, in which sterility need not be anticipated, while introducing new races (unless on the principle of preventing breeding in and in) will not be of much benefit to fisheries, unless the food is in excess of local requirements, for if not the new-comers will revert to the colour, form, and size of the original tenants of the water.

Two papers by Mr. Charles Darwin—(1) on the action of carbonate of ammonia on the roots of certain plants, and (2) the influence of carbonate of ammonia on chlorophyll bodies—were read. The observations which led

to the first of these papers were originally made many years ago on *Euphorbia peplus*, and have now been extended to other genera. A plant of *E. peplus* having been dug up and carefully washed, the smaller rootlets may be placed under the microscope without further preparation, the thicker roots may be examined by means of sections. If such roots are left, before being examined, in a solution of carbonate of ammonia (1 to 7 per 1000) for a short time (varying from a few minutes to several hours), they present a wonderfully changed appearance. The most striking alteration is that the surface of the root assumes a *longitudinally striped appearance*, due to longitudinal rows of darker brown cells, alternating with lighter-coloured rows. The darker colour is seen under a high power to be due to the presence of innumerable rounded granules of a brown tint, which the lighter-coloured cells are without. Similar brown granules are deposited in cells scattered throughout the parenchyma, and markedly in the elongated endoderm cells surrounding the vascular bundle. The granules are apparently neither resinous nor fatty, for they are not removed by alcohol or ether; they are, however, slowly acted on by caustic potash, and seem to be of the nature of protein. The most remarkable part of the phenomenon is that the granules are only formed in some of the external cells, and that these cells are, before the treatment with ammonia, indistinguishable by their shape or by their contents from their fellows, which are unaffected by the solution. There is, however, a curious functional difference between the two classes of cells, namely, that the granular cells do not produce root-hairs, which arise exclusively from the cells of the light-coloured rows. Effects similar to those now described were observed in some other Euphorbiaceous plants, e. g., *Phyllanthus compressus*, though not in all the genera of this family which were observed. Among genera belonging to other families may be mentioned *Drosophyllum* and *Cyclamen*, as showing the phenomenon especially well. Altogether 49 genera were observed: of these 15 were conspicuously acted on, and 11 in a slight degree, making together 26 genera, while the roots of the remaining 23 genera were not acted on in any plain manner.

The view suggested by Mr. Darwin is that the granular matter is of the nature of an excretion, the arrangement of the dark-coloured cells in rows agreeing with what is known of the disposition of certain cells whose function admittedly is to contain excretions. The granules, moreover, are deposited in the loose exfoliating cells of the root-cap, where they cannot take part in the life of the root; and this fact points in the same direction.

In his second paper, above referred to, Mr. Darwin adduces facts to prove that carbonate of ammonia causes a kind of aggregation in chlorophyll bodies, and as these are protoplasmic, the belief in the protoplasmic nature of the aggregated masses in *Drosera* and other carnivorous plants is supported.

ZOOLOGICAL SOCIETY OF LONDON.

April 4, 1882.—Prof. W. H. FLOWER, LL.D., F.R.S., President, in the chair.

Mr. Selater exhibited and made remarks on an example of a rare Flycatcher, *Cyanomyias caelestis*, from the Philippines, which had been sent to England for determination by Dr. Moesch, of Zurich.

Mr. Selater also exhibited and made remarks on two specimens of the Subcylindrical Hornbill, *Buceros subcylindricus*, which had been formerly living in the Society's Gardens.

Dr. A. Günther read the description of a new species of fresh-water Turtle from Siam, a specimen of which had been recently acquired by the British Museum. The author proposed to name it *Geoemyda impressa*, from the peculiar shape of the principal upper plates, which are not merely flattened, but distinctly concave.

Mr. W. A. Forbes read a paper on the structure of the convoluted trachea of two species of Manucode, *Manucodia atra* and *Phonygama Gouldi*, and added remarks on similar conformations in the tracheæ of other birds.

Mr. J. E. Harting read a paper on the eggs of three species of wading birds which had been obtained by the Rev. W. Deans Cowan in the neighbourhood of Fianarantsoa, in the Betsileo country, Madagascar. The species to which these eggs belonged were *Glareola ocularis*, *Ægialitis Geoffroyi*, and *Gallinago macrodactyla*. Much interest attached to these eggs as not having been previously described.

A communication was read from Mr. E. P. Ramsay, containing the description of a supposed new species of *Tephros*, an example of which had been obtained by the late Mr. S. White while collecting at the Aru Islands. The author proposed to name it *Tephros Whitei*, after its discoverer.

April 18, 1882.—Prof. W. H. FLOWER, LL.D., F.R.S., President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of March, and called special attention to a Radiated Fruit-Cuckoo, *Carpococcyx radiatus*, from Sumatra, purchased March 31st, and quite new to the Society's Collection.

Prof. Flower read a paper upon the mutual affinities of the animals composing the order *Edentata*, in which the usual binary division into *Phyllophaga* (or *Tardigrada*) and *Entomophaga* (or *Vermilingua*) was shown not to agree with the most important structural characters. These, according to the interpretation put upon them by the author, indicate that the *Bradypodidae* and *Megatheriidae* are allied to the *Myrmecophagidae*, and

also, though less closely, to the *Dasypodidae*—all the American forms thus constituting one primary division of the order, from which both the *Manidae* and *Orycteropodidae* of the Old World are totally distinct.

A communication was read from Mr. Charles Darwin, introducing a paper by Dr. Van Dyck, of Beyrout, on the modification of a race of Syrian street dogs by means of natural selection.

Mr. Oldfield Thomas read an account of a small collection of mammals made by Mr. A. Forrer in the State of Durango, Central Mexico, in which examples of several northern forms not hitherto recorded so far south, and several southern forms not hitherto known so far north, occurred.

A communication was read from Mr. Edward Bartlett, containing notes on a collection of mammals and birds formed by Mr. J. Hauxwell in the neighbourhood of Nauta, Elvira, and Loretoyacu, on the Peruvian Amazons. The collection contained examples of new species of *Thamnophilus* and of *Crypturus*, which were proposed to be called *T. loretoyacuensis* and *C. Balstoni*.

A communication was read by Mr. Edgar A. Smith, containing an account of the collections of terrestrial and fluviatile Mollusca lately made in Madagascar by Mr. W. Johnson and the Rev. W. Deans Cowan. Various new and interesting species of the genus *Cyclostoma*, *Vitrina*, *Helix*, *Stenogyra*, *Melanatria*, *Cleopatra*, *Ampullaria*, *Limnaea*, *Physa*, *Planorbis*, *Corbicula*, and *Pisidium* were described.—P. L. SCLATER, *Secretary*.

ENTOMOLOGICAL SOCIETY OF LONDON.

April 5, 1882.—H. T. STAINTON, Esq., F.R.S., &c., President, in the chair.

Mr. Lionel de Nicéville, of Calcutta, was elected a member.

Mr. T. R. Billups exhibited a box of Hymenoptera, the specimens being mounted on glass, which admitted of their under sides being readily examined.

The Rev. H. S. Gorham exhibited a remarkable variety of a *Coccinella*; although intermediate between *C. oblongo-guttata* and *C. ocellata*, Mr. Gorham did not believe it to be a hybrid. Several members remarked on the really small amount of variation to be found in this group, although commonly believed to be variable.

Mr. R. McLachlan exhibited his collection of Trichoptera, contained in five cabinet drawers, and made some remarks thereon.

Mr. A. G. Butler communicated a continuation of his "Heterocerous Lepidoptera collected in Chili by Thomas Edmonds, Esq." Forty-five *Noctuae* were noticed in the present paper.—E. A. FITCH, *Hon. Sec.*
